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UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Summary Review of Monthly Reports*
for
SOIL CONSERVATION SERVICE RESEARCH**

OCTOBER 1947

EROSION CONTROL PRACTICES DIVISION

Wheat Vs. Grain Sorghum in 1947 - C. J. Whitfield, Amarillo, Texas.-

"Wheat produced 8.9 bushels more per acre than grain sorghum on comparable experimental areas. The wheat yield was 27.7 bushels per acre in comparison to 18.8 bushels of grain sorghum. These areas have been planted to wheat and sorghum since 1941. The cash income per acre from wheat was \$52.08. The cash income per acre from the grain sorghum was \$33.70, a difference of \$18.38 per acre in favor of the wheat.

Early Hegari in Cropping System-"With only 2.03 inches of rainfall from the date of planting, June 12, to the date of harvest, October 10, early Hegari produced 24.8 bushels of grain per acre. The crop was produced mainly on moisture stored in the soil from rains occurring in October 1946 and May 1947. The protective stubble left, after combining the grain, varies from 12 to 18 inches in height, which is expected to furnish ample protection from wind erosion during the winter and spring months without requiring emergency tillage treatment."

Influence of Rotation and Contour on Cotton Yield - George W. Hood, Batesville, Arkansas.-

Practices	Pounds Seed Cotton Per Acre
BAXTER SOIL	
Continuous Cotton with slope	114
Cotton in Rotation on Contour	400
OZARK SOIL	
Continuous Cotton with slope	228
Cotton in Rotation, Strip Crop, Contour	782

"This record confirms my earlier statement that in spite of the drought and intense heat, the cotton that was grown under conservation practices and contoured, made very satisfactory yield, while cotton grown with the slope and no conservation practices was little better than a failure.

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**All Research work of the Soil Conservation Service is in cooperation with the various State Experiment Stations.

"The records show that the yield per acre was approximately 3-1/2 times greater, on both the Ozark and Baxter soils, where conservation practices were used as compared with no conservation."

Farm Management and Conservation Tour - Pike County, Illinois,
October 3, 1947 - E. L. Sauer, Urbana, Illinois.-"Some of the points discussed were:

Pike County Land Classification
Percent of Land:

<u>By Slope</u>		<u>By Productivity</u>	
0 - 2% slope	5	High Productivity	11
2 - 7% slope	15	Moderate high productivity	19
7 - 15% slope	25	Moderate productivity	18
15% and over	25	Moderate low productivity	52
Bottom tilled	24		
Bottom untilled	6		

Pike County Land Use
Percent of Cropland

<u>Present</u>		<u>Recommended</u>	
Intertilled Crops	51		36
Small Grains	20		26
Rotation Hay and Pasture	24		38
Idle and Failure	5		0

"Less than 5 percent of Pike county's cropland is in alfalfa and alfalfa-brome and yet alfalfa-brome is one of the most profitable crops and is badly needed on much of the sloping cropland."

"In 1946, the farm account keeping farms in Pike county had a net farm income of \$29.07 per acre - they spent only \$1.00 per acre for land improvements (limestone, phosphate, fertilizer, conservation practices, fencing, etc.) - their cropping program resulted in a net plant food removal valued at approximately \$2.50 per acre (based on present fertilizer prices) - in addition, the plant food removed by erosion might be estimated at 4 to 20 times that removed by crops - hence the current high returns represent a considerable sale of capital assets and most certainly will be reflected in lower farm income in coming years."

Benefits from Good Soil Management - O. R. Neal, New Brunswick, New Jersey.-"The comparison of different crop rotations on the runoff plots is now in the sixth year of operation. Runoff and soil loss data for the current year, necessarily, are not yet available. In the previous year, however, sweet corn in a continuously cultivated system lost 7700 pounds of soil per acre. In a 3-year rotation including a year of sod, sweet corn lost 4700 pounds of soil during the same period. In a rotation where one compost application is made and intensive cover cropping is practiced, the loss was 2500 pounds. When the compost, cover cropping, and year of sod were combined in one rotation the soil loss under sweet corn was 2400 pounds per acre. Water losses were in the same order of magnitude."

"Sweet corn yields from these cropping systems during 1947 are shown in the following tabulation.

Sweet Corn Yields in Different 3-Year Cropping Systems

Treatment	Yield - No. 1 Ears	
	Total No.	Weight - lbs.
Continuous cultivation	10660	6570
Sod - 1 year in 3	11770	7350
Cover crop annually and compost once in rotation cycle	13760	8630
Sod - 1 year and cover crop and compost	13530	9160

"These figures again emphasize the fact that the soil management practices which are most effective in reducing soil and water losses are also most effective in increasing crop yield and quality."

Effect of Land Management on Soil Compaction - Sterling J.

Richards, New Brunswick, New Jersey. "In connection with our penetrometer studies a farm was found where the following three cultural practices had been carried out on areas which were located close together in the same field: (1) continuous potatoes for the past ten years or more; (2) continuous potatoes except for the past year when it grew wheat; (3) continuous sod except for the past two years when it grew potatoes. The following table gives the relative force required to penetrate the soil with a probe rod at the various depths indicated.

Depth inches	Continuous Potatoes pounds	One Year Wheat pounds	Former Sod Area pounds
1	7	7	18
2	15	19	26
3	49	45	45
4	83	69	61
5	100	78	72
6	111	90	78
7	116	90	82
8	137	102	94
9	149	126	
10	180	150	93
11	210	144	72
12	204	114	73
13	156	102	60
14		96	66
15		90	78

"The large differences below 9 inches between the former sod and the other areas may have been due to moisture differences. The records were made following a one-inch rain which ended an unusually long dry spell. If this is the case, it would indicate much more rapid penetration of water in the old sod area."

Increase in Corn Yields from Contouring Varied with Soil Type -
Dwight D. Smith, Columbia, Missouri.-"Results of 5 contour corn tests harvested this season from field trial studies in the state were as follows:

Soil type	Land slope %	Stalks (no./acre)		Yield (bu./acre)		Increase in yield from contouring Bu.
		Contour	Up & Down	Contour	Up & Down	
Menfro	4.0	8569	7022	29.8	8.1	21.7
Marshall	2.5	6182	5735	54.1	49.0	5.1
Marshall	6.5	6489	5645	71.9	64.6	7.3
Grundy	4.0	6887	6081	32.8	31.6	1.2
Putnam	3.0	9550	8712	25.9	24.6	1.3
Average	4.0	7535	6639	42.9	35.6	7.3
Average for upper half of all strips	3.5	7192	6307	37.6	35.8	1.8
Average for lower half	4.3	7866	6815	47.3	35.0	12.3

Erosion Rate and Soil Organic Matter Decline - "We have plotted the change in organic matter content against soil loss for 10 rotations at McCredie. On all those rotations having an annual soil loss of less than 2-1/2 tons per acre the organic matter content remained constant or increased during the 6 years the plots have been in operation. On those rotation having soil loss greater than 2-1/2 tons per acre the organic matter content declined. The greatest gain in organic matter content was on the continuous grass legume grazing areas. The greatest loss in organic matter content was on the corn-oats rotation without soil treatment. On all small grain-lespedeza systems the organic matter content remained constant or showed a slight increase. The 4-year notation of corn-corn-oats-wheat and sweet clover and the annual rotation of barley and soybeans both showed a decline in organic matter content.

Experimental Potato Harvester Shows Promise - John W. Slosser, Orono, Maine.-"The experimental potato harvester was tried out near LaGrange, Maine. Although field operations of the unit were terminated by a broken axle, performance indicated that mechanical harvesting of potatoes is feasible and practical. In the short test the vine removing unit worked very satisfactorily. The machine delivered clean potatoes with much less

bruising than was expected. The indicated capacity was higher and labor requirements lower than estimated. It is unfortunate that breakage and other unavoidable delays presented further tests this season!

Residual Effect of Erosion and Land Management on Corn Yield at Geneva - E. A. Carleton, Geneva, New York. "Field corn was harvested from the erosion-control plots on October 23. The yield data for grain are summarized below:

Management 1936-1946	Soil Loss	Corn Yield
	1936-1946	1947
	Tons an acre	Bu. an acre ¹
<u>Ontario sandy clay loam:</u>		
Bluegrass sod.	-	100
Buckwheat sown in trash.	9	97
Soybeans, fall plowed.	7	95
Soybeans sown in trash.	11	94
Winter rye, summer fallow.	77	72
Fallow continuously	200	62
<u>Dunkirk silty clay loam:</u>		
Vegetable crop rotation.	31	82
Fallow continuously	352	54

¹/ Bushels per acre of shelled corn calculated on basis of 15 per cent moisture.

"The variety of corn planted was Wisconsin hybrid 275. All plots were fitted, seeded and managed in identical fashion during the past growing season. The rate of fertilizer was 1,000 pounds per acre of 10-10-10. The yield of corn is a measure of fertilizer efficiency as influenced by soil erosion and soil management practices."

Bean Yields Show Some Benefit from Contouring - G. R. Free, Marcellus, New York. "An average increase of 1.8 bushels of pea beans per acre was obtained from contouring, as compared to planting with rows extending up and down a 10-percent slope. This is the 6th year of operation of these direction-of-row plots. During 1947, both sets of plots lost some soil and water, and, from observations of these losses which occurred shortly after planting, the differences in losses were not great. The yield difference in 1947 is probably due to cumulative effects of treatment over the period. The yields follow:

Yield of Beans Per acre				
Block	Contoured		Up-and-down rows	
	Plot	Bushels	Plot	Bushels
1	2	25.4	1	23.4
2	3	24.1	4	21.3
3	5	24.5	6	23.9

"During recent years, there has been a tremendous increase in bean acreage in Central New York. This is a result of very favorable price and demand, but it undoubtedly has contributed to intensifying the erosion problem. Rows are generally parallel to field boundaries, and the soil is practically bare over the winter. Most of the beans are threshed at a central location rather than by combine in the field which would result in a return of residues for soil protection."

Pounds of Available Nitrogen Developed on Land in First and Second Year Corn After First and Second Year Sweetclover in 1947 - F. L. Duley, Lincoln, Nebraska.-

<u>Tillage</u>	<u>Sampling depth - Feet</u>									
	<u>0-0.5</u> Lbs.	<u>0.5-1</u> Lbs.	<u>2</u> Lbs.	<u>3</u> Lbs.	<u>4</u> Lbs.	<u>5</u> Lbs.	<u>6</u> Lbs.	<u>0-1</u> Lbs.	<u>0-3</u> Lbs.	<u>0-6</u> Lbs.
<u>First-year corn after first-year sweetclover July 7, 1947</u>										
Subtilled	10.2	6.9	15.1	16.8	16.5	19.1	15.7	17.1	49.0	100.3
Plowed	9.0	5.2	14.7	19.7	18.8	18.3	16.4	14.2	48.6	102.1
<u>First-year corn after second-year sweetclover July 7, 1947</u>										
Subtilled	19.7	9.6	16.7	18.1	19.2	24.1	30.6	29.3	64.1	138.0
Plowed	19.2	11.0	19.5	17.2	22.3	26.8	34.7	30.2	66.9	150.7
<u>Second-year corn after first-year sweetclover July 10, 1947</u>										
Subtilled	17.3	8.9	20.7	16.4	12.5	10.5	10.8	26.2	63.3	97.1
Plowed	21.6	16.7	30.2	20.2	12.2	10.5	9.7	38.3	88.7	121.1
<u>Second-year corn after second-year sweetclover July 15, 1947</u>										
Subtilled	24.3	6.6	15.1	17.6	22.0	23.0	23.5	30.9	63.6	132.1
Plowed	19.0	5.9	17.1	25.2	28.2	27.6	26.9	24.9	67.2	149.9
<u>Mean.</u>										
Subtilled	17.9	8.0	16.9	17.2	17.6	19.2	20.2	25.9	60.0	116.9
Plowed	17.2	9.7	20.4	20.6	20.4	20.8	21.9	26.9	67.9	131.0

Water Storage in Subsoiled vs. Non-Subsoiled Grainland - Maurice Donnelly, Riverside, California.-"To determine the effect of subsoiling on water intake and water storage in stubble-mulched grainland, field trials were established in the fall of 1946 on the Haskell Plots in the San Geronio Soil Conservation District near Beaumont, California. These plots are a joint activity of the Research and Operations Divisions.

"As the term is used in the Pacific Southwest, subsoiling refers to a cultural operation in which a heavy chisel is dragged through the soil, in this case to a depth of about 10 inches. In the plots under study, subsoiling was carried on as nearly as possible on the contour. At the time treatments were applied about a ton of straw was present on the surface of the

plots. The subsoiling operation buried about one-third of that straw.

"Water stored from the rains of the winter of 1946-47 under the two different treatments is shown in the following table. Values for the surface six inches are not shown as that zone is strongly affected by evaporation. Values from depths below 72 inches are not shown because it is presumed they represent soil below the root zone.

Table Showing Water Storage Subsoiled and Non Subsoiled Fields

HORIZON	6"-12"	12"-18"	18"-24"	24"-30"	30"-36"	36"-48"	48"-60"	60"-72"
Water in subsoiled fields (percentage of dry weight of soil)	8.9	10.7	10.7	11.6	11.7	11.9	12.0	11.2
Water in Non-subsoiled fields (Percentage of dry weight of soil)	8.2	9.77	9.7	10.2	10.8	11.4	11.0	9.7
Water gain, subsoiled fields (percentage of dry weight of soil)	0.7	1.0	1.0	1.4	0.9	0.5	1.0	1.5
Water gain, subsoiled fields (percentage increase in available water)	22	21	21	27	16	8	17	32

"In summary, water storage was significantly increased under subsoiling, In the zone from six inches to 72 inches, this increase equalled about an inch of surface water. Stated in another way, under subsoiling the increase of stored water available to plant roots in this same zone was about 20 per cent."

Corn Yields as Influenced by Tillage and Residue Management and Rotation Practices in 1947 - Ralph A. Cline, Brookings, South Dakota.-

Tillage Residue Management Study

Grain Stubble Left Previous Yr.	Subsurface Tilled-Bu/A	Moldboard Plowed-Bu/A	Oneway Disked-Bu/A	Average Bu/A
None	36.2	35.9	31.4	34.5
6" stubble	34.1	37.7	33.3	35.0
6" stubble and manure	37.6	38.6	35.7	37.3
12" stubble	34.5	34.9	32.9	34.1
All straw returned	35.1	40.1	32.0	35.7
Average	35.5	37.6	33.1	

"Moldboard plowing outyielded subsurface tillage by 2.1 bushels per acre and oneway disking by 4.5 bushels per acre. Corn yields were increased only by the manure treatment.

"The corn on the grass plots made more rapid growth, had larger stalks and ears, was earlier maturing, and on an average had a slightly higher percent of stand than the tillage and residue plots.

"Corn yields in 1947 as influenced by grass in a corn-wheat rotation were as follows:

		Crested Wheatgrass Bu/A	Western Wheatgrass Bu/A	Average Bu/A
Corn-wheat check	41.0	--	--	41.0
Two years grass	--	40.4	44.5	42.5
Three years grass	--	42.1	39.7	40.9
Four years grass	--	43.2	38.8	41.0
Average	41.0	41.9	41.0	

"Two years grass gave the highest average yield, while three years grass gave the lowest average yield. The difference between the highest and lowest is only 1.6 bushels per acre which is not a large difference. In the variety treatment crested wheatgrass gave the highest average yield, but the difference between any of the treatments is not great."

Legume or Green Manure Benefits Wheat - G. M. Horner, Pullman, Washington. "Crop yields on the rotation plots show that legume crops used as green manure crops increase the production of wheat grown in the rotation. Results for 1947 and the average yields for a 7-year period are given below.

Rotation	Crop	Yield (Bu./A.)	
		1947	Ave. 1941-47
Winter wheat - summer fallow	Wheat	21.3	29.8
Winter wheat - pea (seed)	Wheat	26.8	26.6
	Peas	19.6	28.0
Winter wheat - peas (green manure)	Wheat	40.8	33.8
Winter wheat - Hubam clover (green manure)	Wheat	34.4	30.9
Sweet clover and grass (2 years) -	W. Wheat	43.1	41.9
winter wheat - peas - spring wheat	Peas	18.8	27.4
	S. Wheat	38.2	32.6
Alfalfa and grass (4 years) - spring	S. wheat	30.3	32.0
wheat - winter wheat - peas - spring	W. wheat	37.5	37.0
wheat	Peas	22.9	27.2
	S. Wheat	35.7	29.8

Soil Moisture in Relation to Burning and Tillage - Torlief A. Aasheim, Bozeman, Montana. "Moisture samples taken at Froid, during the month showed slightly less moisture than the average of samples taken in the fall for the past seven years. The following table is a summary of moisture determinations run this fall.

Average percent of soil moisture per foot of soil (to a depth of five feet) in various fallow and stubble plots at Froid, Montana, Samples taken in October, 1947.

Treatment	Residue Management	Average % Moisture Per Foot
Noble sub-surface tiller	B	13.3
Noble sub surface tiller (fall tilled)	T	13.8
Noble subsurface tiller	T	12.0
M.B. plow, duckfoot & waffle	B	13.0
M.B. plow, duckfoot and waffle	T	10.6
M.B. plow, duckfoot and waffle	T	12.1
M.B. plow rod weeder	T	12.8
M.B. plow basin lister	T	12.5
Oneway	T	12.7
Corn Ground	T	9.5
Idle (weeds mowed)		8.9
Idle		8.3
Stubble (not tilled)		10.1

B - Stubble burned; T - Stubble not burned; Fall tilled - Subtilled immediately after harvest 1946.

Random Sampling Versus Complete Harvest of Grain Plots - "For the past two years the yields on the various plots at Havre have been determined by the quadrat method and also from total plot yield. This has been done in order to check the accuracy of the quadrat method. Twelve (meter square) quadrats have been harvested at random from each of the plots, the plots are slightly less than one-half acre in size. The table below shows how the yields from the two methods have compared on the different treatments.

Yields per acre of spring wheat as computed from quadrat and total plot yields, Havre, Montana, 1946 and 1947. (Yields given are averages of triplicated plots in each case).

Treatment		1946		1947	
		Bu. Per Acre	Bu. Per Acre	Bu. Per Acre	Bu. Per Acre
		Determined	Determined	Determined	Determined
		By	From Total	By Quadrat	By Total
		Quadrat Yield	Plot Yield	Yield	Plot Yield
Sweep S.S. Tiller	B	15.5	16.6	14.4	15.1
"	T	13.9	14.3	14.1	13.9
Blade S.S. Tiller	B	16.3	16.5	13.8	14.4
"	T	15.2	16.1	15.8	15.1
Mold Bdless plow	B	15.6	15.6	14.1	13.6
"	T	13.0	13.6	14.3	13.9
Mold Bd. plow D.F.	B	15.0	16.0	16.1	15.2
"	T	13.8	14.8	14.6	14.7
Mold Bd. plow R.W.	B	15.0	16.2	15.4	15.6
"	T	14.8	15.3	15.9	15.1
Oneway	B	17.1	18.3	14.8	15.3
"	T	18.0	17.2	14.0	14.0

"In 1946 yields computed from total plot yields were higher on all treatments except one, and in 1947 the distribution was nearly equal, that is yields computed from quadrat samples were high approximately one-half of the time. In 1946, the largest spread in yield between the two methods of yield determination was 1.2 bushels, and in 1947, the largest spread was .9 of a bushel. This information may be of particular interest to Work Unit Conservationists and other field personnel who lack confidence in the quadrat method of yield determination. It is quite generally assumed that higher yields result from the quadrat method of yield determination than would be derived from total plot yields. This has definitely not been the case in this study."

Results from Row Grade and Length Plots During June, July and August - T. L. Copley, Raleigh, North Carolina. - "Data for the three summer months from these plots has recently been summarized and may be of interest here. This is given in the following table.

Short Plots (121. ft.)

	Rainfall	12" Row Grade		18" Row Grade		24" Row Grade		Ave. 3-Grades	
	In.	In.	Tons/A.	In.	Tons/A.	In.	Tons/A.	In.	Tons/A.
June	4.54	.79	.78	.59	.94	.75	1.43	-	-
July	7.90	2.04	1.16	1.86	1.66	2.06	2.33	-	-
August	4.06	1.34	.69	1.30	.98	1.27	1.12	-	-
3-mo. Period	16.50	4.17	2.63	3.75	3.58	4.08	4.88	4.00	3.70

Long Plots (181.5 ft.)

June	4.51	.55	.80	.78	1.11	.74	1.61	-	-
July	7.90	2.01	1.17	2.05	1.58	2.12	2.42	-	-
August	4.06	1.40	.88	1.45	1.16	1.74	1.49	-	-
3-mo. Period	16.50	3.96	2.85	4.28	3.85	4.60	5.52	4.28	4.07

Ave. 3-mo. 2 lengths	16.50	4.06	2.74	4.02	3.72	4.34	5.20	-	-
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"Notice that there is little, if any, increase in runoff between the 12 and 24" Row Grades, but there is a consistent increase in soil loss. The rate of increase in soil loss is less than that found for previous years in spite of the excess amount of rainfall. This can probably be explained further by the fact that no very high intensity rains occurred this past summer. Differences in row lengths continue to be of minor importance.

Kudzu-Grain Rotation Continues Promising - In the 3-year rotation of corn, grain and kudzu, an excellent growth of corn was made and kudzu completely covered the ground in the corn by late summer. Following the grain in this rotation, kudzu completely covered the ground by late July and made a fairly heavy growth by the fall. Apparently, such a rotation would furnish some grazing or hay the same year the grain is harvested.

"In a similar rotation grain sorghum was planted in rows following the small grain as a second row crop. The sorghum has made excellent growth and while the kudzu has not covered the ground as it did in the corn there is a sufficient amount to reestablish the stand next year. This first years results indicate that kudzu will not be eradicated or seriously damaged to the point where it will not make satisfactory recovery."

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DRAINAGE AND WATER CONTROL DIVISION

Hydrologic Studies - W. D. Ellison, Beltsville, Md.-An article entitled "Soil Erosion Studies" - Part VII--Soil Transportation by Surface Flow," was published in the October issue of "Agricultural Engineering," pp. 442-444, 450.

Hydrologic Studies - L. L. Harrold, North Appalachian Experimental Watershed, Coshocton, Ohio.-"October rainfall totaled 0.97 inch. In certain areas there was insufficient soil moisture for what-seed germination. The additional moisture in the soil on mulch areas was noticeably effective in giving the wheat a better start. This was apparent at this station and at the Wooster station."

Hydrologic Studies - R. W. Baird, Blacklands Experimental Watershed, Waco, Texas.-"The total rainfall for the month was 0.22 inch. The total for the year through October 31 has been only 19.99 inches compared with a normal of 29.32 inches. From June 1 through October 31 the total has been 4.18 inches, while the normal is 13.27 inches. Since June 1 there has been a rainfall deficiency of almost 10 inches.

"Considerable work has been done on the analysis of runoff records. At the 20-acre areas W-10, without conservation practices, and Y-10, which has conservation practices established in the fall of 1942, records are now available for a total of 39 storms, 11 of these since conservation practices were established on area Y-10. While the number of storms is small and the rates of runoff are of rather limited range, preliminary results indicate a reduction in peak rate of runoff of about 0.4 inch per hour caused by conservation practices. This is in close agreement with the studies made on the larger areas Y-2 and W-1 of 130 and 170 acres, respectively. A few records are also available for the 20-acre area Y-6. Although not enough records are available from this area to justify the same type of analysis as used on the Y-2; W-1 area, it appears that the differences on this area will be somewhat greater.

"From the limited soil-loss records available the following data have been worked up for the two 20-acre areas W-10 and Y-6.

Area	Soil losses in tons	
	1941	Dec. 1942 - July 1943
W-10	239.09	109.50
Y-6	284.21	9.92

"Area Y-6 had conservation practices established in the fall of 1942 prior to December 1. During the year 1941 both areas were cropped and farmed without conservation practices as nearly alike as was possible. The soil-conservation practices reduced the soil losses measured at the measuring station at the lower end of the watershed Y-6 to slightly less than one-tenth than that should have been expected without conservation practices. More data are needed on this study for larger storms and for a longer period of record.

"The cotton crop for 1947 was very good considering the very dry weather. The average yield on the Government operated land was 252 pounds of lint cotton per acre. Those areas with conservation practices including Hubam Clover in the rotation had an average yield of 269 pounds per acre."

Hydrologic Studies - John A. Allis, Central Plains Experimental Watershed Project, Hastings, Nebr., - "The mean daily temperature for October was the highest on record and with only 0.50 inch of rain during the month and with previous dry weather the moisture content of the new corn crop ranged from 14 to 18 percent. This small moisture content, which is unusual for this time of year, permitted the corn to be stored or shelled and delivered directly to the granaries, hence the major part of this year's corn crop was harvested prior to November 1.

"The following table shows the yields from seven watersheds in corn for the various practices.

Watershed: Yield : Lbs. corn			Watershed: Yield: Lbs. corn			Watershed: Yield: Lbs. corn		
No.	: in Bu.	: Stalks/acre:	No.	: Bu.	: Stalks/acre:	No.	: Bu.	: stalks/A.
Straight Row			Contoured			Subtilled		
3 H	11.4	1,130	5 H	20.8	1,460	14 H	18.9	1,400
16 H	17.5	1,440	13 H	21.1	2,140	21 H	19.4	1,480
						22 H	23.9	1,800
Ave.	14.4			20.9			20.7	

"This shows at the current price of corn, with a corn, oats, wheat rotation, that contouring and subtilling netted over \$12.50 per acre more than straight row farming. On a few fields which were inspected, having had a continuous corn crop the yields were about 5 bushels per acre. Based on the above figures contouring and subtillage corn in a crop rotation netted over \$30.00 per acre more than continuous corn in straight rows.

"Tentative figures also show the highest peak rates of runoff from the watersheds in straight row corn averaged 1.88 inches per hour, contoured 0.88, and subtilled 1.48 inches per hour.

"The following yields of oats and wheat were measured for different practices on the 4-acre watersheds:

Straight row		Contoured		Subtilled	
Bu. per acre		Bu. per acre		Bu. per acre	
OATS					
12.5		<u>17.5</u>		7.8	
13.2		12.9		11.4	
				8.0	
WHEAT					
23.4		<u>27.6</u>		18.7	
16.0		25.7		17.9	
				16.6	

"It will be noted that the yields on subtilled oats are low. Oats on these watersheds were seeded on May 6, while seeding on straight row and contouring watersheds were made on April 2, 17, and 18. The Nebraska Experiment Station shows that late seeding has a material effect on yields."

Hydrologic Studies - R. B. Hickok, LaFayette, Ind.--"Corn yield sampling is completed. The following table shows the comparison of yields from the 'prevailing' and conservation-treated watersheds:

Table 1.--Corn yields from prevailing and conservation-treated watersheds, Purdue-Throckmorton Farm, LaFayette, Ind.

Treatment ^{1/}	Watershed No.	Yields ^{2/} , Bu./A.
Prevailing	4	91.3
	12	75.6
	Average	83.4
Conservation	2	116.0
	11	105.5
	Average	110.8

^{1/}Prevailing treatment consisted of check planting, w/150 lbs. of 0-14-7 fertilizer applied with seeding, red clover-timothy plowed under. Conservation treatment included contour-drill seeding w/150 lbs. of 0-14-7, and 1,000 lbs. of 8-8-8 fertilizer, 6 tons of manure and alfalfa-red clover-alsike-timothy meadow plowed under.

^{2/}Yields computed at 17.5 percent moisture.

"The above data are averages of 80" x 84" sample areas at 50' x 50' intervals. (Statistical analyses of the data have not been completed). It will be noted that the average yield difference was 27.4 bu./A., in favor of the conservation treatment, which is consistent with results of the previous 5 years.

Runoff Studies - N. E. Minshall, Madison, Wisc.--"The precipitation for Fennimore was 2.42 inches. There were no high intensities and no runoff during the month. Temperatures varied from a maximum of 84 degrees on the 7th to a minimum of 34 on the 1st, with a mean of 56 degrees or 8 degrees above normal. This appears to be the highest mean temperature for any October on record since the Madison Weather Bureau station was established in 1869.

"Precipitation at Edwardsville was 4.44 inches compared with a normal of 3.2 inches. There was a small amount of runoff from the cultivated and mixed-cover watersheds but no runoff from the pastured area. Temperatures varied from a maximum of 85 degrees on the 14th to a minimum of 36 degrees on the 1st, with a mean of 60 degrees which is very near normal."

Runoff Studies - T. W. Edminster, Blacksburg, Va.--"The final revisions were made on the Ridges and Valleys Peak Rate manuscript and the completed manuscript was submitted to the Washington Office for final clearance. Preliminary work has been started on the outline for a similar publication to cover expected yields of runoff for farm-pond design. Rainfall records are being obtained for outlying areas and a series of conferences have been set up with Operations engineers to determine the form in which they wish to have the material presented.

"Mr. Holtan has completed the development of laboratory equipment for the farm-pond studies and has now assembled the entire unit. Considerable time was spent in the development of a satisfactory pressure-control valve in lieu of high priced commercial products. It appears that Mr. Holtan has devised a very satisfactory valve utilizing a household commode-float valve which has been reconverted into a single beam weight-control type of valve. It appears that this mechanism will make possible close control of water pressure in the head studies without danger of fluctuation due to differences in supply-line pressure. Some time has been spent in library research to determine and select standardized techniques for preparing samples for laboratory testing. It is planned that Mr. Holtan will use local soils for initial tests until the limits of errors in the procedures may be determined. When the limits have been arrived at, he will then start the series of tests on the soil samples collected earlier this fall.

Hydraulic Studies - W. O. Ree, Spartanburg, S. C. - "Much of the preliminary computation work was brought up to date. The results obtained from three experiments on channel FCl will be described briefly. Channel FCl is about 400 feet long and 40 feet wide. Originally it was of shallow triangular cross-section with side slopes 1 on 10. Today it is more nearly parabolic. The upper half of the channel is on a 3 percent slope and the lower on a 6 percent slope. The cover is a mixture of native grasses. The center portion is Bermuda grass while the sides consist largely of little blue stem and side oats grama. In addition to these grasses there are some miscellaneous annuals and weeds.

"Experiment 2 was run in the early spring on the still dormant or dead cover. It was in a long state having never been cut. The grasses in the center portion were 8 to 12 inches long and those on the sides up to 60 inches long. Some of the dead stems were upright and others prone, having been bent over in the experiment the previous fall. The tests at this time showed the cover to fall into the class D retardance group, with the 3 percent slope slightly less and the 6 percent slope slightly higher than class D. This was lower than expected. Excessive scour took place at the lowest station at a velocity of 4.6 feet per second.

"Experiment 3 was run the latter part of July. The cover at this time had attained a full lush growth. Lengths of grass were about the same as for experiment 2. The cover now fell into class C plus. This was the class or retardance group which would be expected for the shorter center grasses. Evidently the tall blue stem being mainly along the sides did not have as great a retardance as it would had it been along the center. Excessive scour started to take place in the lower part of the channel during the highest flow. The velocity during this flow was 5.6 feet per second.

"Experiment 4 was run immediately following experiment 3. However, the grass was cut by mowing machine and raked first. The cover height now averaged 3 to 4 inches. As expected the retardance of the cover dropped. It was now down to class D for the 3 percent slope and class D plus for the 6 percent slope. The surprising thing however, was that the retardance for this stubble was not quite as low as it had been for the longer dormant cover. Another interesting point was that ^{for} the very low flows the retardance increased slightly after mowing. This was attributed to the presence of clippings in the cover which

the rake did not remove nor the low flows float out. Velocities were higher for corresponding discharges but the scour rates were not any higher for the cut than for the uncut grass. There are many such apparent inconsistencies in the scour rates obtained from these tests. One of the difficulties is that all tests are made in the same channel. Each flow may alter the channel some. Thus each test is, in effect, made on a different channel. For this reason it is difficult to draw positive conclusions from the data."

Sedimentation Studies - L. C. Gottschalk, Washington 25, D. C.-"A technical letter entitled 'Sounding and Spudding Lines' has been written for limited distribution to technical personnel of the Soil Conservation Service and cooperating agencies engaged in conducting reservoir-sedimentation studies. This letter discusses the various types of sounding and spudding lines now in use, gives specifications for line used for different purposes, outlines methods of marking and painting lines, and gives instructions for the care and verification of lines. In connection with this and other studies, tests were made of one type of sounding line at Beltsville, Md., in cooperation with members of the Hillculture Section.

"A report entitled 'Preliminary Inventory of Published and Unpublished Sediment-Load Data,' which was prepared under the supervision of the Sedimentation Section, SCS, for the Federal Interagency River Basin Committee, Subcommittee on Sedimentation, has been printed and distributed to members of cooperating agencies. This 58-page report lists all of the readily available suspended-load records for streams in the United States and comprises a valuable guide for engineers, hydrologists, and conservationists concerned with the control and beneficial utilization of the Nation's water resources. A final edition of the report will be prepared when field offices have submitted additions and corrections

"Carl B. Brown, in connection with activities of the Federal Interagency River Basin Committee, prepared and submitted to the Subcommittee on Sedimentation a proposal for a research project for the development of sediment-production indices of long-term annual rates of sediment production throughout the United States. The Subcommittee appointed a work group to further study the proposal and investigate possible means of carrying out the project."

Drainage Studies - M. H. Gallatin, Homestead, Fla.-"In connection with the mulch plots, moisture readings for the plots show that the relative position for the various types of materials remain the same, that is pine straw and grass are superior to shavings and of course all three of the above are superior to natural cover. Nitrate sampling of the plots because of the heavy, distributed rainfall was low for this period; shavings plot 4 p. p. m., natural cover 5.4 p. p. m., check 6.0 p. p. m., pine straw 10.4, and grass 14.8 p. p. m.

"Sampling was begun on a new planting of Perisian limes set out at the station. One-half of this block had been mulched with shavings and the other half with grass. The shavings-mulched area began showing signs of malnutrition while the grass-mulched areas remained green. Analysis of samples collected from these two areas showed that in the shavings-mulched area we had 15 p. p. m. of nitrates while in the grass-mulched area we had 28 p. p. m. of nitrates."

Supplemental Irrigation Studies - James Turnbull, Lake Alfred, Fla.-

"The long rainy season, combined with greater than normal rainfall, seems to have reduced the area of 'difficultly wettable' soil in the experimental grove. A total of 226 soil samples were taken under 32 trees and only 15 samples or 6.7 percent were found to be 'difficultly wettable.' The size of the individual 'dry bodies' was much reduced from the size a year ago from observations made. An analysis was made of 70 weekly records of rainfall and lake levels in an effort to determine whether or not there is an appreciable amount of runoff from our experimental grove which is on a 4.4 percent slope. The analysis reveals that of 70 weeks of record the lake level rose during 29 weeks, remained constant during 8 weeks, and dropped during 33 weeks. Of the 29 weeks during which the lake level rose, the amount of rainfall exceeded the rise in lake level during 16 weeks, the amount of rainfall was equal to the rise in lake level during 8 weeks, and only during 10 weeks did the rise in lake level exceed the rainfall. The amounts by which the rise in lake level exceeded rainfall were insignificant, the greatest excess being 0.08 feet. Even during the hurricane rains of September 17 and 18 when 7.23 inches of rain fell the lake level rose only by the amount of the rainfall. The data indicate that surface runoff from the deep sand of this area is, for all practical purposes, negligible on relatively flat slopes."

Supplemental Irrigation Studies - J. R. Carreker, Athens, Ga.-"Rainfall in October was sufficient in amount and well distributed so that irrigation was not needed. The dates and amounts of rainfall were: October 7 - 10, 1.78 inches; October 13, 0.25 inch; October 15 - 17, 1.41 inches; October 24, 0.62 inch; and October 27 - 28, 0.68 inch. The total was 4.74 inches and the normal 2.93 inches.

"Corn harvest was completed on 18 of the 24 plots. This work was hampered by the frequent rains.

"Both the permanent and supplemental pastures grew well with this excellent rainfall condition. However, the portion of the supplemental pasture that was irrigated the latter half of September appeared to have a better stand and growth of the oats, crimson clover, rye grass, and alta fescue grass. Preparations were being made to begin grazing the supplemental pasture when frost kills the grass in the permanent pasture.

"The permanent pasture record for the period of May 5 to September 15, 1947 showed:

	Irrigated	Unirrigated	Increase with Irrigation Percent
Animal days of grazing	1,117	528	111.6
Gain in weight-pounds	1,160	701	65.6
Vegetative growth - T/ac. air dry	6.13	4.56	34.4

"Vegetable yield records were computed on all plots. These records are summarized in the following tables:

Table 1.--Average 1947 yield of tomatoes by quality grades.

Treatment	Excellent	Good	Poor	Total
Irrigated: lb/ac.	21,082	12,852	7,745	41,632
percent of total	50.6	30.9	18.5	100.0
Unirrigated: lb/ac.	19,564	11,964	2,110	33,368
percent of total	58.7	35.0	6.3	100.0
Increase due to irrigation: lb/ac.	1,518	1,158	5,635	8,264

"The tomatoes of excellent quality were large size and without blemish. Those of good quality were medium to small size, with minor blemishes but still marketable. The poor quality were diseased and unmarketable.

"The okra data in table 2 show that irrigation increased the yields 48.5 percent. The poor quality was caused by some pods becoming too large between harvests. Had it been possible to harvest frequently enough, all the pods would have been excellent in quality.

Table 2.--Average 1947 yield of okra by quality grades.

Treatment	Excellent	Poor	Total	Relative Stand
Irrigated: lb/ac.	6,828	2,633	9,461	59.0 percent
percent of total	72.2	27.8	100.0	
Unirrigated: lb/ac.	4,752	1,618	6,370	61.6 percent
percent of total	74.6	25.4	100.0	
Increase due to irrigation: lb/ac.	2,076	1,015	3,091	

"The yield of pole beans given in table 3 shows an increase with irrigation of 73.2 percent over the unirrigated beans. The poor quality of some of the beans was caused by the beans becoming too large or by being limp. Irrigation increased both the quantity and quality of the pole beans.

Table 3.--Average 1947 yield of pole beans by quality grades.

Treatment	Excellent	Poor	Total
Irrigated: lb/ac.	5,505	359	5,864
percent of total	93.9	6.1	100.0
Unirrigated: lb/ac.	2,483	902	3,385
percent of total	73.4	26.6	100.0
Increase with irrigation: lb/ac.	3,022	-543	2,479

"A study of nematode control with three different soil fumigants versus none was superimposed on the irrigated and unirrigated tomatoes, okra, and pole beans. Results with these fumigants showed:

1. With tomatoes, (a) fumigation gave significant increases in yield over no fumigation; (b) irrigation without nematode control was not effective.
2. Soil fumigation gave significant increases in yields of okra with and without irrigation.
3. Soil fumigation had only a minor effect on the yield of pole beans. Irrigation was the principal factor in increasing the bean yields."

IRRIGATION DIVISION

Evapo-transpiration Studies, Santa Ana Valley, Calif. - Dean C.

Muckel, Pomona, Calif.--"A report in preliminary form was completed on 'Consumptive Use in the Valley of Santa Ana River between Riverside Narrows and the Orange County Line.' Annual unit consumptive use (evapo-transpiration) values for a normal year were set up and are as follows: (The entire area has a ground-water depth of 6 feet or less.)

<u>Classification</u>	<u>Annual Consumptive Use</u> <u>Acre feet per acre</u>
Water surface	3.8
Swamp plants, sedges, tules	5.1
Heavy brush and tree cover	4.8
Light brush and tree cover	3.7
Grass	3.8
Cultivated	3.4
Bare sand	1.6

"Annual consumptive-use indices and the monthly distribution of consumptive use were computed by the ratio with the product of mean monthly temperature and percent of daylight hours. The average monthly distribution of consumptive use in percent of the annual is:"

<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Year</u>
7.1	5.6	4.1	5.5	3.1	7.0	7.8	10.2	12.1	14.0	13.4	10.1	100"

V. S. Aronovici, Pomona, Calif.--"Work was resumed on determining wilting range of the soil profile of selected 'fall moisture deficiency' stations. A set of 24 samples were run on the pressure plates during this month to determine the wilting range. Assistance was given Dean C. Muckel in field study of the Carbon Canyon watershed for the purpose of determining the amount of ground-water yield to the Chino Basin from the Chino Hills. Several 'fall moisture deficiency stations' were selected and sampled. Because ground water derived from the Chino Hills appears to contain considerably more sulphates and has a higher conductance than waters of the valley floor, it is possible also to qualitatively evaluate the amount of water derived from the Chino Hills. A preliminary check of well-water analyses of wells adjacent to the hills indicate no determinable influence by ground water from the hills. Additional water samples will be taken from seeps and wells from the Chino Hills to establish conclusively that such water is distinctively high in dissolved solids, especially sulphates."

In connection with the Los Angeles West Coast Study, Mr. Aronovici reports, "Soil moisture samples were taken on five stations located for the purpose of measuring 'fall moisture deficiency.' Two additional stations were selected and sampled also. Moisture determinations of these samplings indicated a surprisingly high moisture content in the soil profile. Stations with weed cover showed moisture depletion to more than 5 feet, but other stations which had a spring grain crop showed very little moisture removal below 3 feet."

San Fernando Valley Investigations - William W. Donnan, Los Angeles, Calif.-"Logs from about 100 wells in the San Fernando Valley Soil Conservation District have been placed in a master file of well logs. Using the data on soils as revealed by these borings, six profiles have been drawn. These profiles radiate out from a key well at Reseda and terminate near the base of the foothills which rim the north, south, and west sides of the valley. Each profile traverses the high water-table areas of the valley floor. Preliminary examination of these profiles reveals an interesting stratification sequence of water-bearing aquifers which appear to converge on the present high water-table area. An office report recently released by the Los Angeles County Flood Control District's Ground Water Division suggests a similar phenomenon and recommends a thorough inspection of existing and abandoned wells. The purpose of this study would be to ascertain the degree of leakage between strata or the possibility of improper capping and consequent aggravation of the water tables near the ground surface. A canvass is being made of equipment for making a study of well leakage."

Imperial Valley Drainage Investigations - William W. Donnan, Los Angeles, Calif.-"A series of 14 charts have been completed of the East Mesa well and water-table study. These charts trace the past and present ground-water contours and indicate the temperature, dissolved salts, calcium, magnesium, sulphate, sodium, chloride, and boron of the water in the 32 wells. The charts reveal a considerable rise in the water table since water was turned into the Coachella Branch of the All-American Canal. One interesting feature is the increase in boron concentration towards the western side of the East Mesa."

Bradshaw reports, "A ground-water analysis of the Salton Sea Basin has been initiated. Analysis of the Imperial East Mesa has been finished and some interesting data obtained. Analysis indicates a trend in concentration of salts, boron, etc. The Boron trends from 0.62 p. p. m. at the sand hills to 5.20 p. p. m. just east of the East Highline Canal. With this Boron concentration in mind a ground-water analysis study has been initiated on the bad farm land bordering the East Mesa. To date samples indicate about 4.5 p. p. m. of Boron in the ground water in these bad areas. The ground water has probably been slightly diluted by the seepage from the East Highline Canal which runs about 0.45 p. p. m. of Boron. Past research has indicated that concentration of greater than 1 p. p. m. are detrimental to plant growth."

Irrigation Studies - Dean W. Bloodgood, Austin, Tex.-"On the 14th, I accompanied Messrs. John W. Pritchett and H. A. Beckwith, members of the Texas Board of Water Engineers, on an inspection trip of rice-irrigation area in Calhoun County. Mr. C. S. Clark, former chairman of the Board is Vice-President and Manager of the District. Since January, Mr. Clark has installed a pumping plant of six 24-inch Allis-Chalmers pumps (capacity each 8,850 to 9,400 g. p. m.) to pump water from Guadalupe River for the irrigation of 13,000 acres of new rice land. Last year this land was in sod. Mr. Clark estimates about 4,000 acres of additional land will be put into rice next year. His district charges a flat rate of \$10 an acre for rice regardless of the amount used. This year the District gave three flushings of additional water without charge, but Mr. Clark informed me the farmers would be required to pay for the flushings next year. It was noticeable on our inspection trip that the District had the best rice crop we had seen in Texas. The average estimated yield for the District is 20 barrels per acre (162 pounds per barrel). The combines for harvesting the rice cost \$5,000 each."

"At Crystal City we contacted California Packing Corporation (Del Monte Company), County Agricultural Agent, and Soil Conservation Service regarding cooperation and proposed irrigation studies of vegetables. All of the irrigation water is pumped from wells, and at the present rate of withdrawal of the underground water, there are indications of serious water shortage from this source. The discharge of the pump is small--ranging from 400 to 1,000 gpm. Mr. R. E. Laughlin, of the Del Monte Company, informed me that one of their wells is capable of furnishing water for about 213 acres. Their well will furnish about 900 g. p. m. The Company is irrigating 1,166 acres of spinach, greens, beans, carrots, and other vegetable crops. They try to obtain a depth of 18 inches penetration which is sufficient for their crops. They use an electrical resistance method for the continuous measurement of soil moisture under field conditions. This method was devised by G. J. Bouyoucos at the Michigan Agricultural Experiment Station and is described in Technical Bulletin 172.

"The worst shortage of underground water was noticeable in the La Pryor District. We noticed one pumping plant was delivering about 400 gpm. into an earthen ditch which was about 1/2 mile in length before the water was applied to the crop. According to the Soil Conservation Service who made seepage determinations there was a loss of 25 to 30 percent.

"We also visited the Carrizo Springs District where we contacted the Soil Conservation Service office and the Rouw Company who desired to cooperate with us in making a study of water uses of crops for that area. The Rouw Company operates 22 wells which furnish water for irrigating about 1,900 acres of land at 5 farms. They irrigate large acreages of vegetables but they also irrigate between 600 and 700 acres of citrus.

"At Winterhaven, we contacted Mr. C. H. McDowell, Superintendent of Texas Agricultural Sub-Station No. 19. He is irrigating about 230 acres with a well capacity of about 400 gpm. He desires for the Main Station to cooperate with us. I also visited their meteorological station, and I noted they were obtaining evaporation records from a Bureau of Plant Industry pan that was not properly installed. Instead of being sunken into the ground, it extended about 14 inches out of the ground but the water was maintained at ground level.

"On the 8th and 9th, Mr. Beckwith and I visited and inspected the Maverick Co. Water Control and Improvement District No. 1 near Eagle Pass. The District is irrigating 30,000 acres but the distribution system is capable of irrigating 60,000 acres. The crops being irrigated are vegetable (all year-round crops), cotton, and grain sorghums. The main canal diverts water from the Rio Grande about 6 miles below Del Rio and is approximately 100 miles in length. It has a capacity at the head works of about 1,500 second feet but below Eagle Pass it has a capacity of about 600 second feet. Near Eagle Pass some of the water is used to develop electric power and wasted back into the Rio Grande. All of the structures are made of concrete and there is considerable mileage of gunite lining. There are a number of siphons under arroyas. One of the siphons is 5,000 feet in length. Raw land, good soil, with water rights at the present time is valued at \$15-\$25 per acre and improved irrigated land at \$100 per acre. There are many concrete drops on the distribution system which are suitable locations for the installation of weirs for water measurement. The District officials are desirous of cooperating with us in the measurement of water to the farms. There are many locations for weirs but the number will

depend upon the number of waterstage recorders that are available to record the flow on the weir crests. Probably 8 or 10 weirs equipped with flow recorders will be installed to measure water during 1948. The water for irrigating is silty as there are no dams or obstructions on the Rio Grande above the intake to the main canal. The water for the District will probably remain silty. On our visit I obtained samples of water at various places along the 100-mile canal for silt determinations. At the intake the percentage of silt by weight amounted to 0.020 and 0.016 percent; at 32.3 miles below intake (near power plant), 0.036 and 0.047 percent; at 47 miles below intake, 0.027 and 0.029 percent; and 87.1 miles below intake (Lateral No. 71), 0.065 and 0.066 percent.

Silt Studies - "During the month a new silt sampling station was established at the tail race of the power house at Buchanan Dam. For several years there has been a water-sampling station at Inks Dam which is several miles below Buchanan Dam. The status of the new sampling stations on the Rio Grande and its tributaries in cooperation with the International Boundary and Water Commission has not been decided at the time this report is written.

"We have ordered a number of the Fort Peck type manometers which will be used in making mechanical analyses of the daily silt samples from some of the Texas streams. The suspended-silt and bed-load material we are obtaining with our sampling device which is known as Department of Agriculture and Texas sampler."

Irrigation Studies - Geo D. Clyde, Logan, Utah-"Dean Fuhriman reports a very constructive meeting between representatives of Operations, Regions 5, 6, and 7, Ivan Wood and Wayne D. Criddle of the Irrigation Division. This conference was called to discuss the proposed manual on "Methods of Water Application." Most of the differences of opinion were reconciled and the manual is now being prepared for duplication.

Mr. Fuhriman also reports the completion of the snow-course summer maintenance program and the completion of the summary of all snow-cover measurements in Utah up to 1947. This summary has been completed and is now being distributed.

Howard Maughan reports that most of the field work covering his project on Activities, Needs and Accomplishments of Utah Drainage Districts has been completed. Two principal tables covering this work are being prepared for study and analysis of the field data. One is a master table on which is recorded information for each drainage district by counties, showing the name and location of the district, year organized, kind of drainage system, area drained, number of landowners, effect of drainage on land use by time periods, present functioning of drains, assessed benefits, capital costs, annual costs for operation and maintenance, assessments, tax delinquency and acquisition of land by tax deed.

The other general table records the financial aspects of each district and shows the cost of drains by sources of financing, interest rates, refinancing and debt retirement as to payments, write-off or defaults, together with present financial status of the district.

This information when compiled will be of major interest to the people who are interested in drainage of irrigated land and the organizations necessary to put such drainage into effect.

Table 1.--Summary of meteorological and evaporation data and a coefficient for conversion of evaporation losses for various pans at Buchanan Dam Station on Colorado River, Texas, for period of August 1943 to July 1947.

Period	Mean Temperature		Precipitation	Wind Movement	Total evaporation losses				Coefficient for conversion			
	Maxi- mum	Mini- mum			Weather Bureau pan1/	Bureau of Plant Industry pan2/	Division of Irrigation pan3/	Weather Bureau pan to evapo-ration from Div. of Irrig. pan	Weather Bureau pan to evapo-ration from Bureau of Plant Industry pan	Ratio	Ratio	Ratio
	Deg F	Deg F	Inches	Miles	Inches	Inches	Inches	Ratio	Ratio	Ratio	Ratio	Ratio
1943-44	76	55	30.96	33,816	80.52	65.07	61.05	0.76	0.81	0.76	0.81	0.94
1944-45	76	55	39.41	35,333	82.06	66.19	61.57	.75	.81	.75	.81	.93
1945-46	(4)	55	30.80	35,048	83.85	67.66	63.87	.76	.81	.76	.81	.94
1946-47	78	53	26.56	35,402	79.37	64.27	62.21	.78	.81	.78	.81	.97
Mean	77	54	31.93	35,900	81.45	65.80	62.18	.76	.81	.76	.81	.94

1/ Pan: 10" high and 48" diameter, supported by wooden platform on surface of ground.

2/ Pan: 24" high and 72" diameter, sunk in ground, top rim of pan about 2" above ground surface.

3/ Pan: 36" high and 24" diameter, sunk in ground, top rim of pan about 2" above ground surface and covered with 1/4" galvanized hardware screen.

4/ Maximum thermometer was broken and could not be replaced--incomplete record.

(Above table taken from Dean V. Bloodgood's report.)

Karl Harris of Phoenix, Ariz., reports a trip through New Mexico where he was accompanied by Joel Fletcher, R-1 Research for SCS located at Tucson, Ariz. The purpose of this field trip was to contact field-work groups and discuss with them irrigation and drainage problems. Harris and Fletcher met with the Regional staff at Albuquerque where considerable interest was shown in Harris's report on research findings. Mr. Harris spent considerable time at Albuquerque discussing the detail of water-application methods and infiltration of water and tillage practices under irrigation. Upon his return to Phoenix, he met the work group at Phoenix and discussed in detail the place of irrigation in the preparation of farm plans.

Snow Survey Studies - J. C. Marr, Boise, Idaho - "New snow-course locations were selected and/or investigated in Upper Snake River Drainage above Palisades Dam Site and in Boise River Drainage above Anderson Ranch Dam as follows:

- (1) Gros Ventre Summit located exactly on the summit between Gros Ventre and Green Rivers in Section 36, T 40 N, R 111 W --- Elevation 8750'.
- (2) Blind Bull Summit located exactly on the summit between Greys and Green Rivers in Section 6, T 34 N, R 115 W --- Elevation 9400'.
- (3) Poison Meadow located at the extreme headwaters of Greys River near the divide between Greys River and La Barge Creek a tributary to Green River in Section 30, T 30 N, R 116 W --- Elevation 8500'.
- (4) Salt River Summit located exactly on the divide between Salt and Bear Rivers in Section 26, T 29 N, R 118 W --- Elevation 8000'.
- (5) Logwotee Pass # 2 snow course --- a relocation of Logwotee Pass #1 with location and elevation approximately the same.

"These five new snow courses are surveyed, cleared, and temporarily marked. Arrangements are made for snow surveys as of March 1 and April 1, 1948. Gros Ventre Summit, Blind Bull Summit, and Poison Meadow courses will be measured in accordance with a contract with Rex Young. Air transportation will be employed to reach these courses. The contract covers airplane rental, pilot and snow-surveyor's compensation and subsistence and selection and preparation of a landing strip. Mr. Von Lippets, District Forest Ranger, Afton, Wyo., will measure the Salt River Summit course. Mr. James Braman, Reservoir Superintendent, Bureau of Reclamation, will measure the Logwotee #2 course.

"Mr. Rex Young is employed by Call Airplane Mfg. Co. at Afton, Wyo. He is a licensed pilot and owns the airplane which will be used on the snow-survey trips. He is an experienced snow surveyor, having made the snow surveys on the Deadman Ranch course since 1935.

"In accordance with the plans submitted to Dr. E. N. Torbert under date of August 11, 1947, and approved by letter from J. R. Riter to George D. Clyde dated September 30, 1947, a location for a new snow course was tentatively selected in Section 4, T 5 N, R 5 E at elevation 9000 feet on the headwaters of Big Smokey Creek, a tributary of South Fork Boise River. Also arrangements were made for the Sawtooth National Forest to assist with a March 1 and April 1

snow survey on the new course at Couch Summit, Section 9, T 2 N, R 14 E.

"The course at Big Smokey Summit will actually be located early next spring when the snow is on the ground. The trip will be made via Big Wood River with an M-7 snow mobile at Division of Irrigation, Soil Conservation Service personnel assisted perhaps by Boise Project employees. It will be necessary to climb the summit between Big Wood and Boise Rivers by foot---a round-trip distance of approximately 16 miles and a climb of 2,500 feet in elevation. It was found impossible to arrange locally to have this snow survey made."

Irrigation Studies - Carl Rohwer, Ft. Collins, Colo.--"A report of unusual value of the snow surveys for the 1948 season was received from Mr. I. J. Matthews, Project Manager of the Kendrick Project on the North Platte. Due to unusually large carry-over of water in the Seminoe Reservoir Mr. Matthews states that he can get a minimum of 25 cents an acre-foot for dump power if he can know that next year's flow will be normal or above by March 1. Otherwise he would have to bypass the water. This power value may be as high as \$100,000.

"Work on the preliminary plans for the Well Screen Performance Project was continued by Carl Rohwer. Plans for the tank required for the tests have been completed and the tank is now being built in Denver.

"Mr. Rohwer's report on Seepage Losses from Irrigation Channels is being published by the Colorado Experiment Station as technical bulletin No. 38. Contracts for printing and engraving have been signed and the work is now in progress.

"Equipment has been installed at the Bellvue laboratory for making loss of head tests on an 8-inch standard swing-check valve. Tests are now being conducted at the laboratory. These tests will complete the laboratory work on this project.

"R. L. Parshall designed a simple device for field use in locating the zero point in stilling wells attached to Parshall measuring flumes. He also attempted to develop more satisfactory criteria for determining the relation between fall flow and summer runoff on the Arkansas River. No very satisfactory relation was found.

"Mr. Parshall is spending the period from October to November 2 at the meeting of the National Reclamation Association at Phoenix, Ariz. He will confer with other members of the Division of Irrigation staff who are attending the meeting. From Phoenix he plans to go to California to inspect the sand trap being built in the main canal of the Consolidated Irrigation District."

Snow Survey Studies - R. A. Work and W. T. Frost, Medford, Ore.--"Considerable time by Mr. Frost was given to correlation studies and to analysis of accuracy of forecasts last year. Relative accuracy of the 1946 forecasts has been computed in 45 of 51 cases as follows:

Forecasts "good" or better	-- 35%
" " "fair"	-- 42%
" " "poor"	-- 22%

Average deviation of forecasts from
measured flow 14.1%

"Preliminary figures of 1947 runoff indicate that net inflow to Upper Klamath Lake for the 6 months, April 1-September 30, was 318,200 acre-feet; forecast was for inflow of 330,000 acre-feet - error 3.6 percent.

"The West-wide snow-survey map finally was completed so far as this office is concerned. A move from downtown Portland to Swan Island has somewhat delayed Cartographic in reproducing the maps.

"Gasoline caches along the Cascades were installed preparatory to next winter's operations. Some new snow-course sites along the route were mapped and marked. Also, some Sno-Cat trail was blazed."

Irrigation Studies - Ivan D. Wood, Denver, Colo.-"October 6, 7, 8, Logan, Utah, conference with Regional engineers of Soil Conservation Service at Logan to review work on irrigation manuals. The conference was attended by A. W. McCulloch, Portland, Ore.; C. J. Francis, Lincoln, Nebr.; Kean K. Fuhri-man, Logan, Utah; J. G. Bamesberger, Albuquerque, N. Mex.; and Wayne D. Criddle, Boise, Idaho. Complete accord was reached relative to manual on water distribution.

"October 20, 23, 24, enroute to Albuquerque, N. Mex., and conference there with Regional engineer, J. G. Bamesberger and his staff. One day was spent in the field inspecting leveling work. Had a very satisfactory meeting with Cy Luker, Regional Conservator. He wishes to have me assist with problems in Arizona.

"October 27, 28, 29. Los Cruces, New Mex. Appeared at three meetings of the New Mexico Annual Extension Conference. Gave four hours to discussion of irrigation problems, teaching methods, and Extension-SCS relationships. Attendance included 30 County Extension Agents, 10 Extension staff members and 8 SCS personnel."

Hydraulic Studies - Stephen J. Mech, Prosser, Wash.-"A total of 12 plot-irrigations were made during the month. The alfalfa plots, irrigated only when the available moisture dropped to 60, 35, and 15 percent received a total of 9, 6, and 4 irrigations, respectively, during the season. The fourth and last cutting of the season was made on October 6. Yields for this cutting are expected to be about $1\frac{1}{4}$ tons per acre. The water in the Sunny-side canal was turned off October 20, thus putting an end to the irrigation for the year. The plots and equipment will be put in condition for the winter when labor for doing so becomes available. The need for next years' plowing up of the alfalfa for potatoes requires considerable moving and changing of equipment before that time.

"Computation for the current season's data is being carried on when time permits"

12/8/47

